

ABSTRACT OF THE DISCLOSURE

Disclosed is a routing apparatus for obtaining routing data conforming to a destination address of a packet that arrives from a line, adding the routing data  
5 onto the packet, and switching the packet based upon the routing data to send the packet to a prescribed line. The routing apparatus has a main controller equipped with content addressable memories (CAMs) corresponding to respective ones of line speed. When search key data  
10 with an attached line identifier is received from a line card, routing data is generated by the content addressable memory (CAM) corresponding to the line speed and the routing data is sent to the line card. The line card adds routing data of which it has been notified by  
15 the main controller onto a packet and then outputs the packet. A switch to which a packet having attached routing data is input from a prescribed line card switches the packet based upon the routing data and sends the packet to another line card.

09757300-012301

UNITED STATES PATENT AND TRADEMARK OFFICE  
DOCUMENT CLASSIFICATION BARCODE SHEET

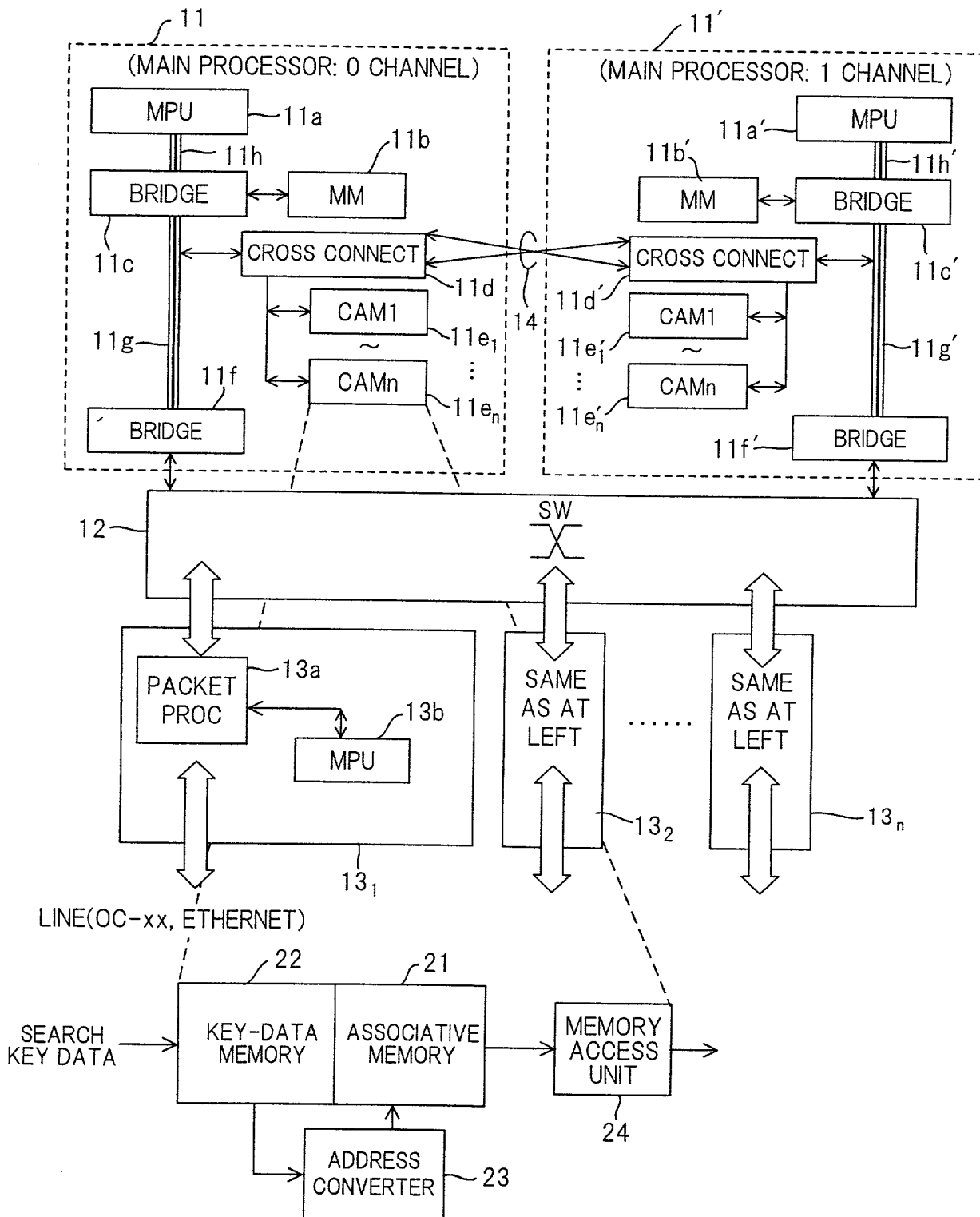


# Drawings

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09767302-01.2304

FIG. 1



**FIG. 2A**

## TRANSMISSION OF OC-12C PPP PACKET

| ITEMS  | VALUE | IP DATA FLUCTUATION | TOTAL TRANSFER TIME( $\mu$ S) |
|--|-------|---------------------|-------------------------------|
| OC-12C TRANSFER TIME   | 1.6   | 1                   | 0.36                          |
| PPP + FIXED PART OF IP HEADER (bytes)                                | 27    | 2                   | 0.37                          |
| IP DATA FLUCTUATION (bytes)  | n     | 3                   | 0.39                          |
|  |       | 4                   | 0.40                          |
| TOTAL TRANSFER TIME = (n + PPP + FIXED PART OF IP) * OC-12C TRANSFER |       | ~                   | ~                             |
|  |       | 10                  | 0.48                          |
|  |       | ~                   | ~                             |
|  |       | 64                  | 1.17                          |
|  |       | ~                   | ~                             |
|  |       | 128                 | 1.99                          |
|  |       | ~                   | ~                             |
|  |       | 1024                | 13.52                         |
|  |       | ~                   | ~                             |
|  |       | 1500                | 19.64                         |

**FIG. 2B**

## TRANSMISSION OF OC-192C PPP PACKET

| ITEMS   | VALUE | IP DATA FLUCTUATION | TOTAL TRANSFER TIME( $\mu$ S) |
|---|-------|---------------------|-------------------------------|
| OC-192C TRANSFER TIME(ns)   | 0.1   | 1                   | 0.02                          |
| PPP + FIXED PART OF IP HEADER (bytes)                                 | 27    | 2                   | 0.02                          |
| IP DATA FLUCTUATION (bytes)   | n     | 3                   | 0.02                          |
|   |       | 4                   | 0.02                          |
| TOTAL TRANSFER TIME = (n + PPP + FIXED PART OF IP) * OC-192C TRANSFER |       | ~                   | ~                             |
|   |       | 10                  | 0.03                          |
|   |       | ~                   | ~                             |
|   |       | 64                  | 0.07                          |
|   |       | ~                   | ~                             |
|   |       | 128                 | 0.12                          |
|   |       | ~                   | ~                             |
|   |       | 1024                | 0.84                          |
|   |       | ~                   | ~                             |
|   |       | 1500                | 1.23                          |

FIG. 3

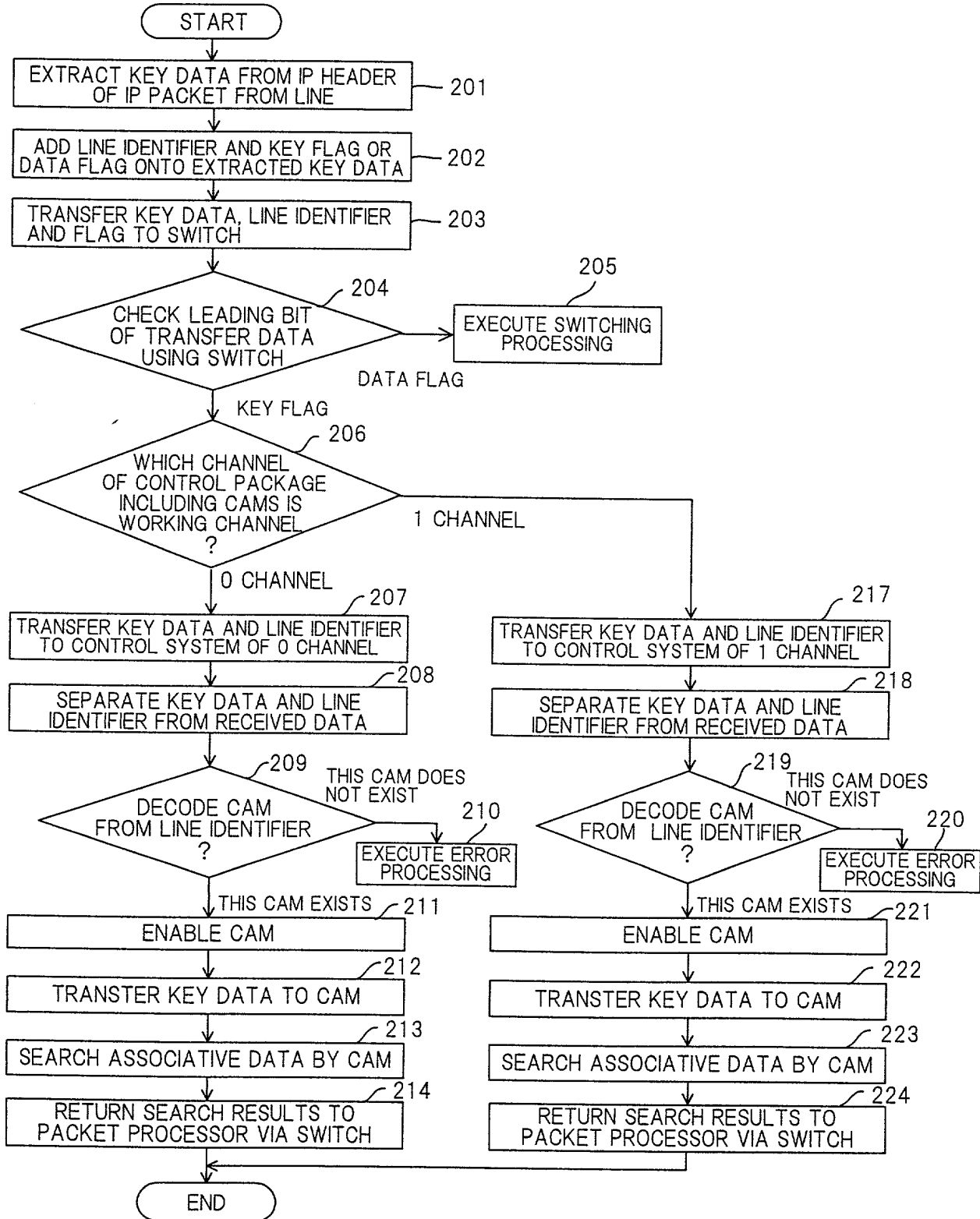


FIG. 4A

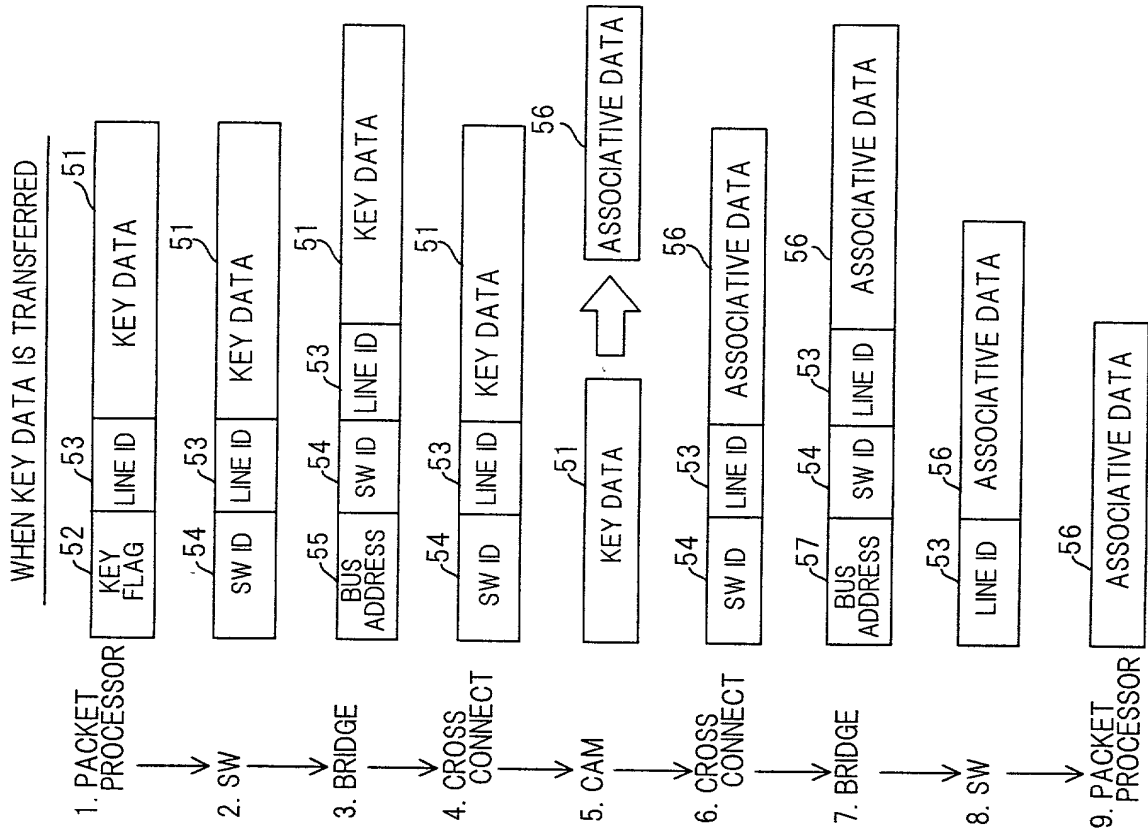


FIG. 4B

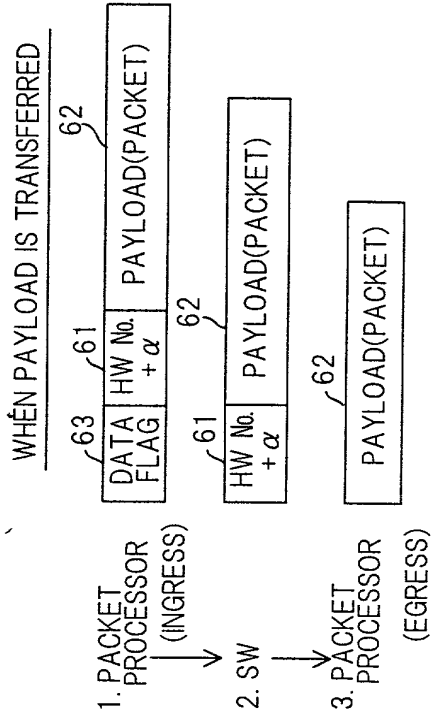


FIG. 5

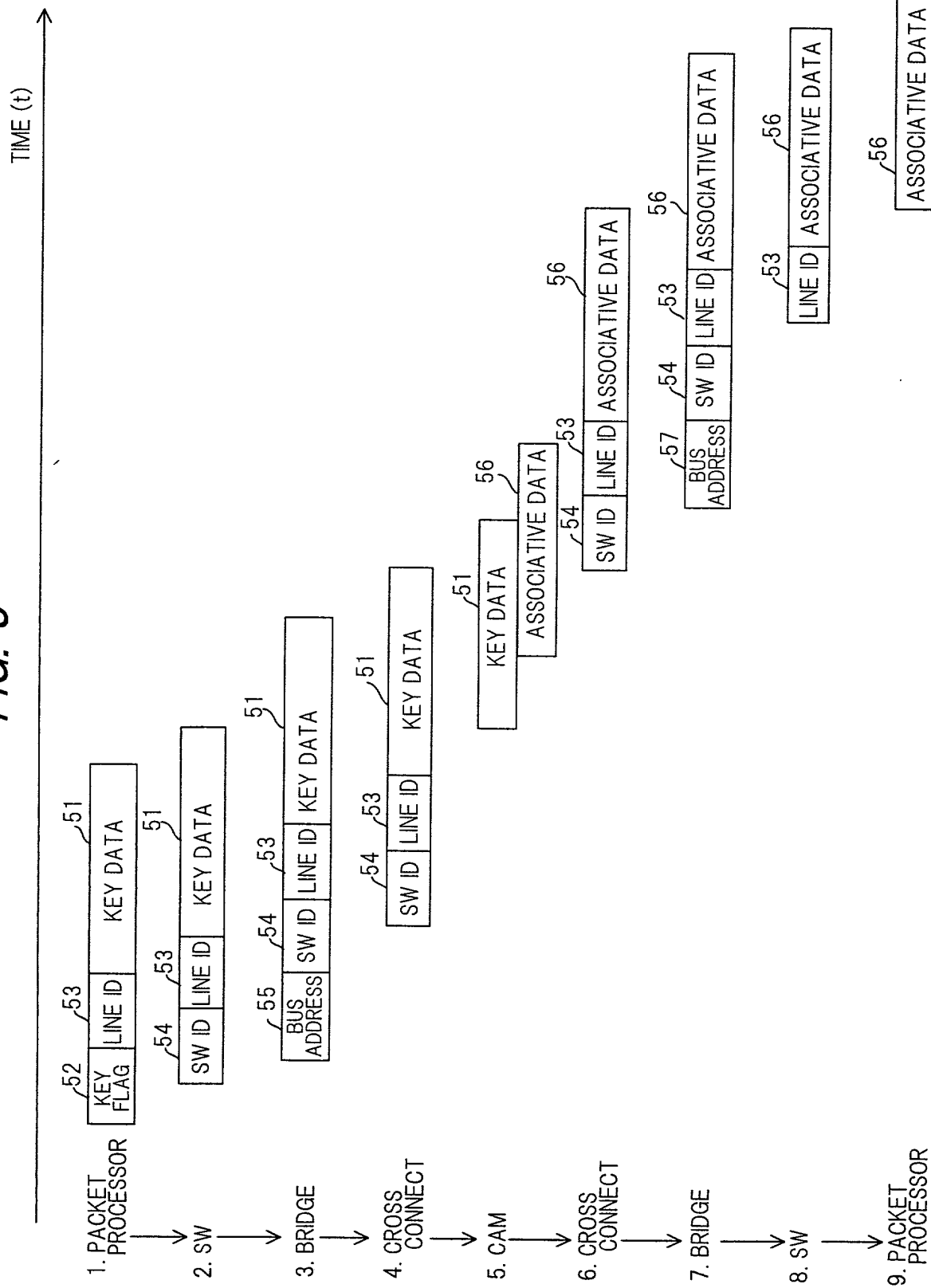


FIG. 6

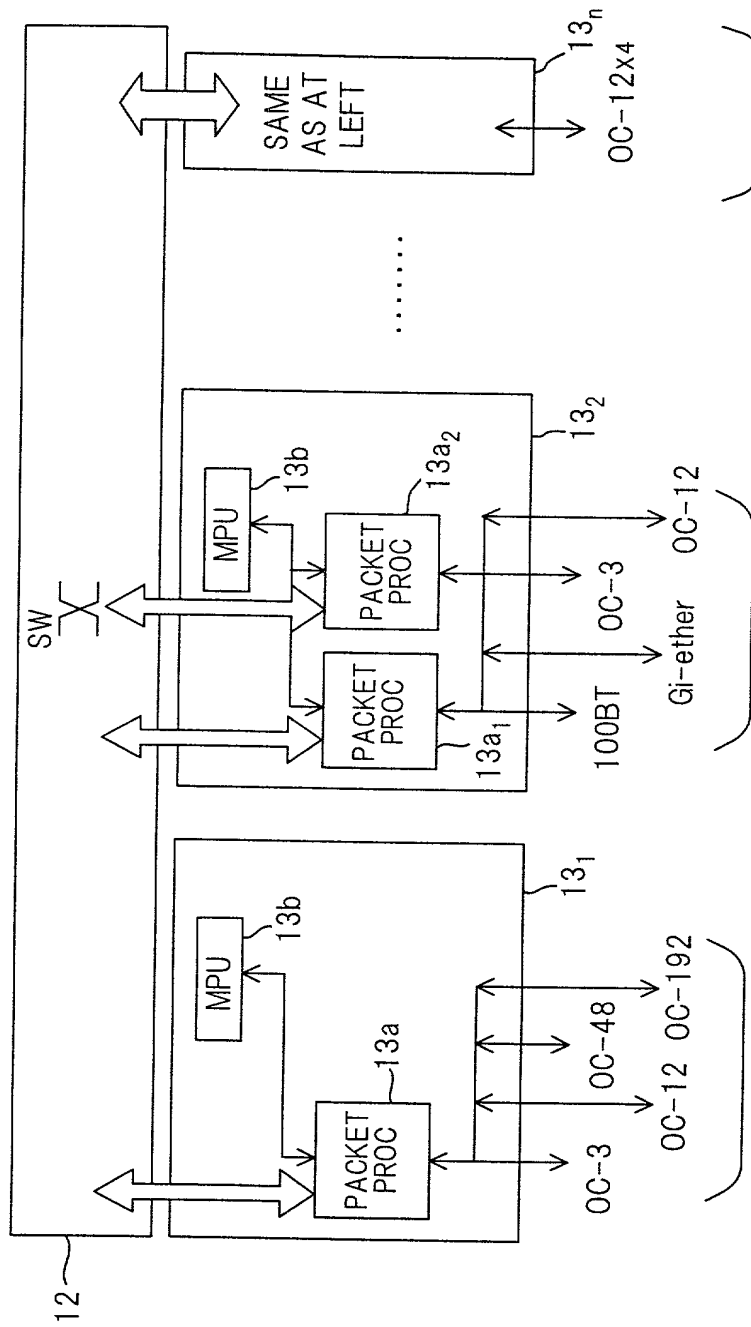
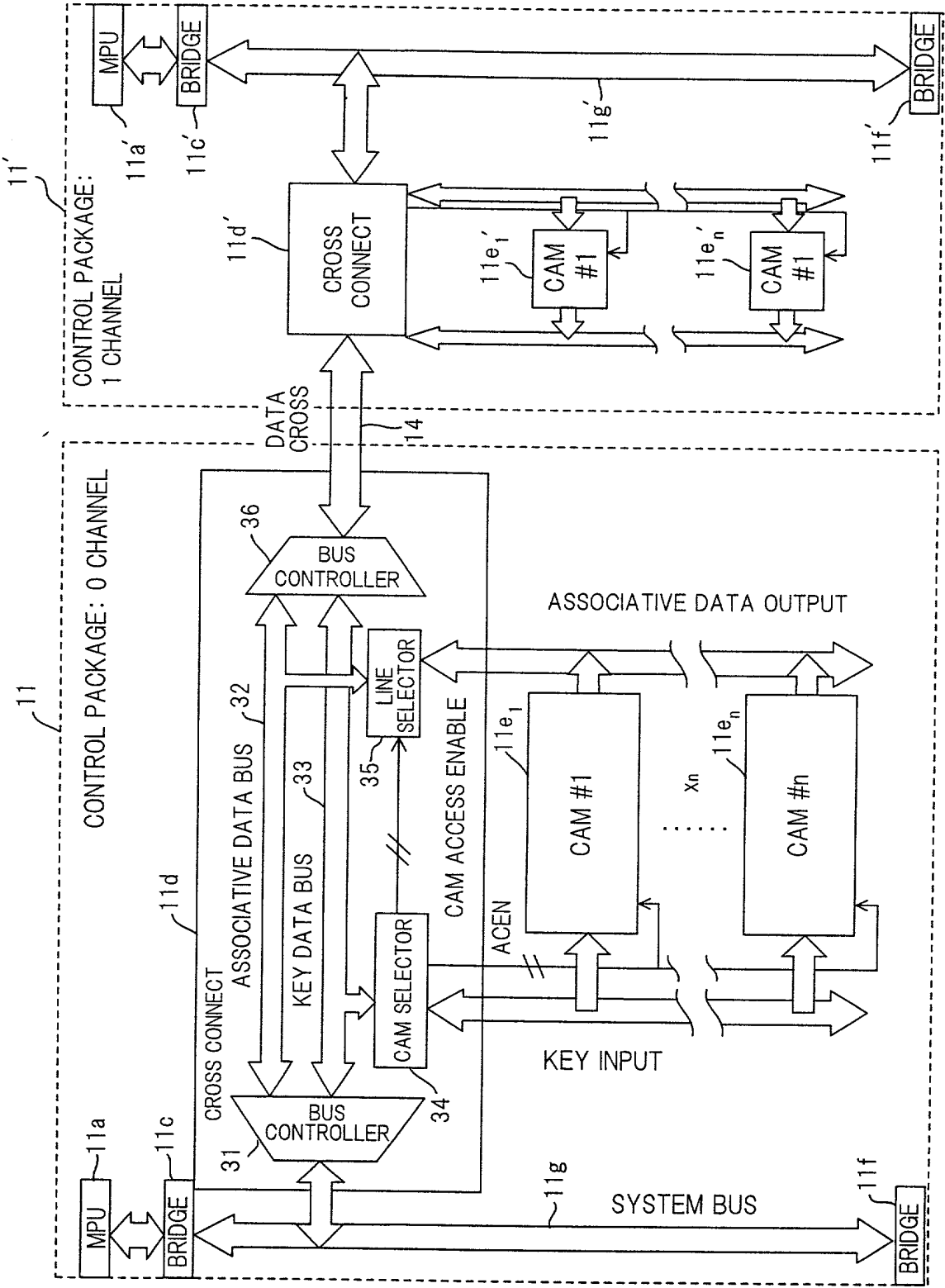
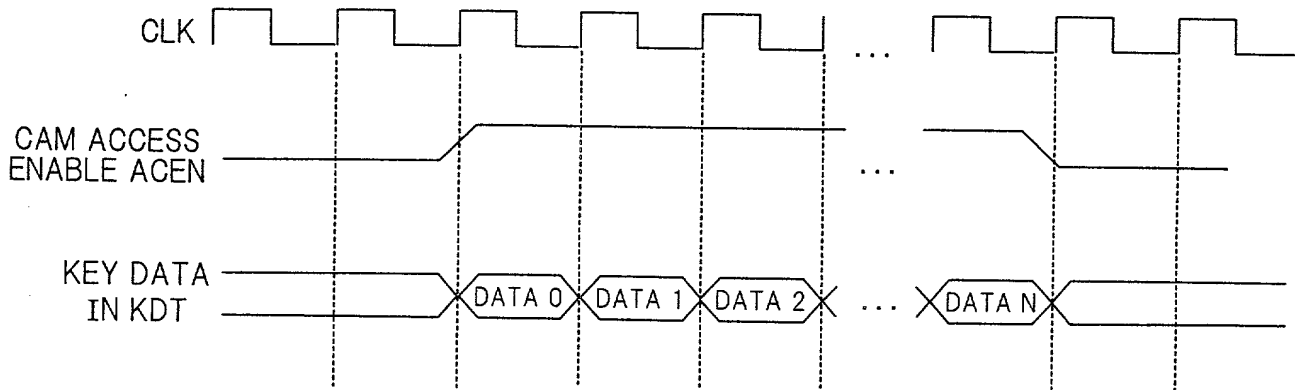




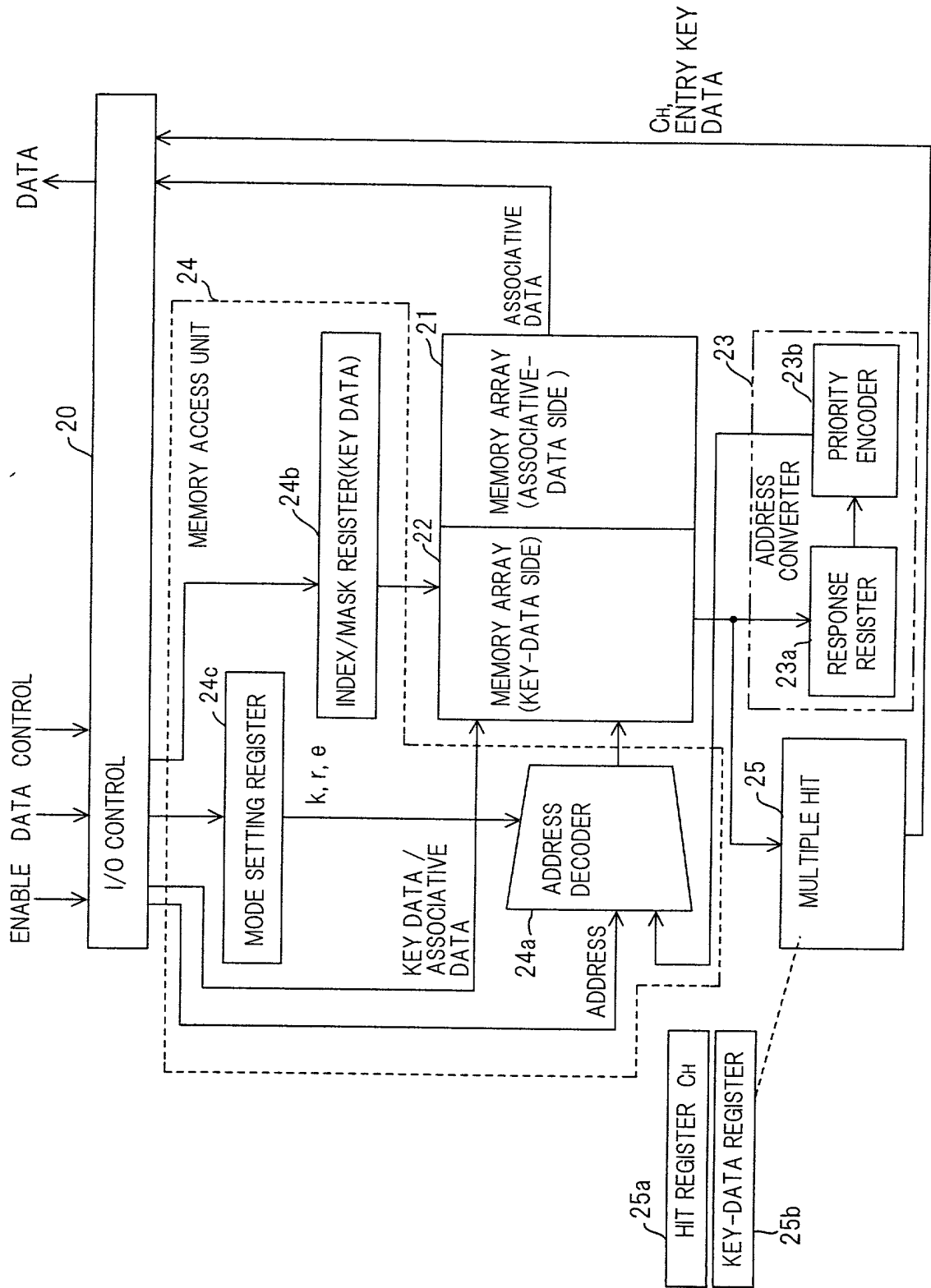
FIG. 7



*FIG. 8**FIG. 11*

|                                |   |       |        |
|--------------------------------|---|-------|--------|
| RAM CELL WIDTH (bytes)         |   | 1     | 1      |
| RAM CELL WORD COUNT            | y | 1,000 | 16,384 |
| KEY DATA WIDTH (bytes)         | k | 4     | 16     |
| ASSOCIATIVE DATA WIDTH (bytes) | r | 2     | 2      |
| TOTAL ENTRY COUNT              |   | ↓     | ↓      |
| $e=y/(k+r)$                    | = | 167   | 910    |

FIG. 9



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*FIG. 10*

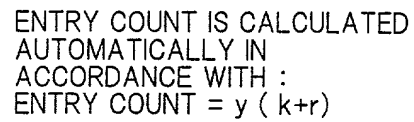
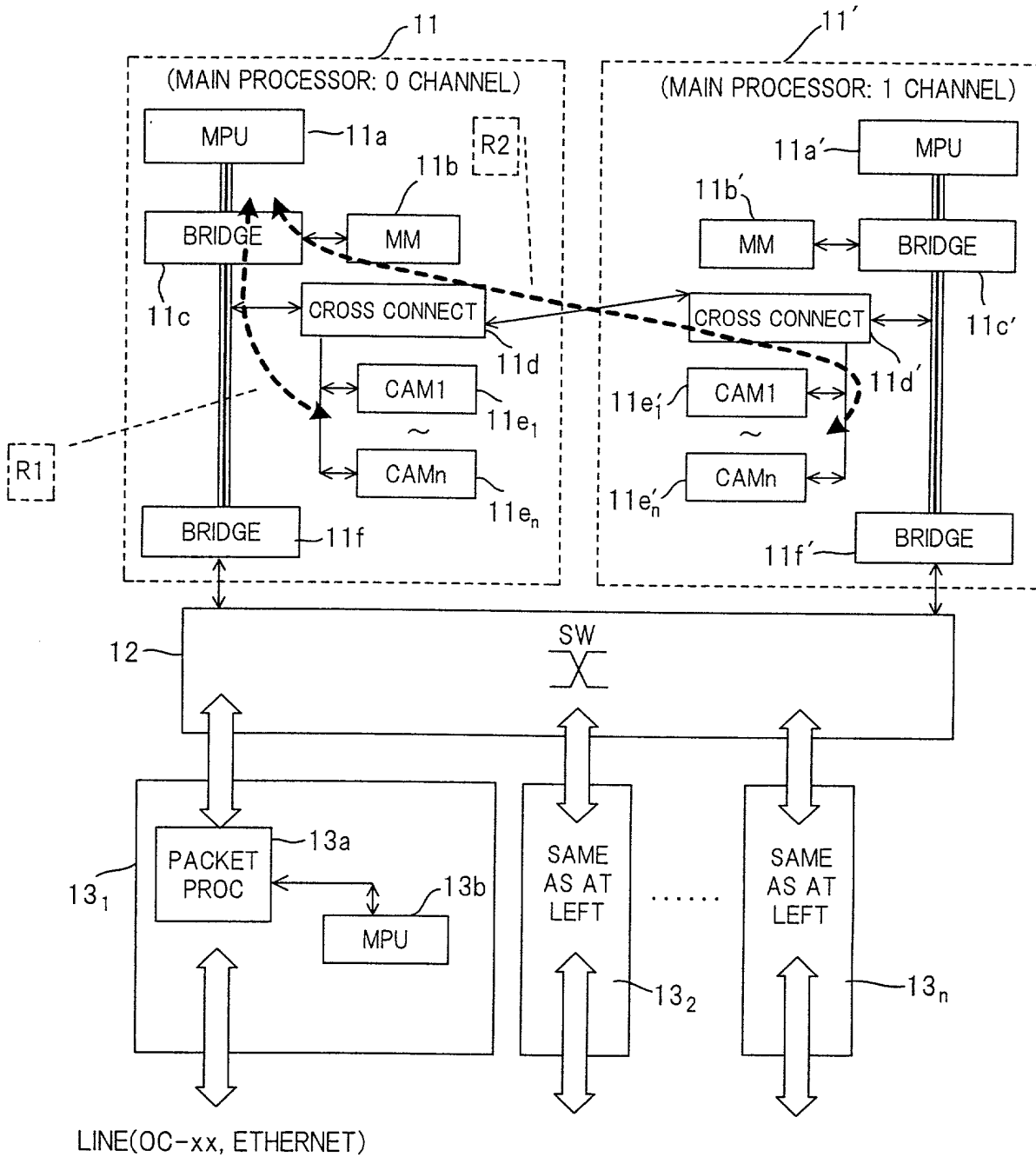


FIG. 12



LINE(OC-xx, ETHERNET)

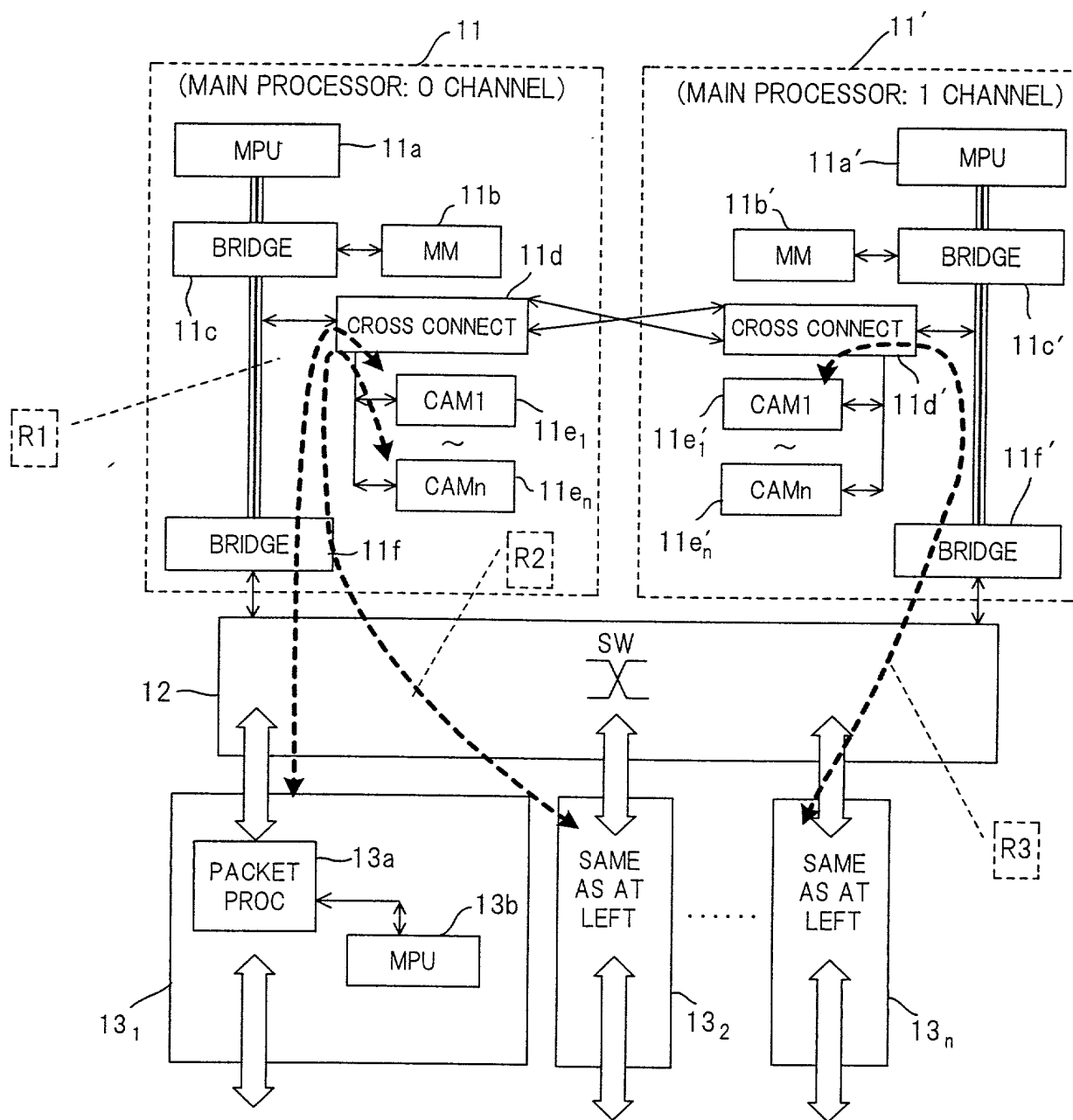


FIG. 14

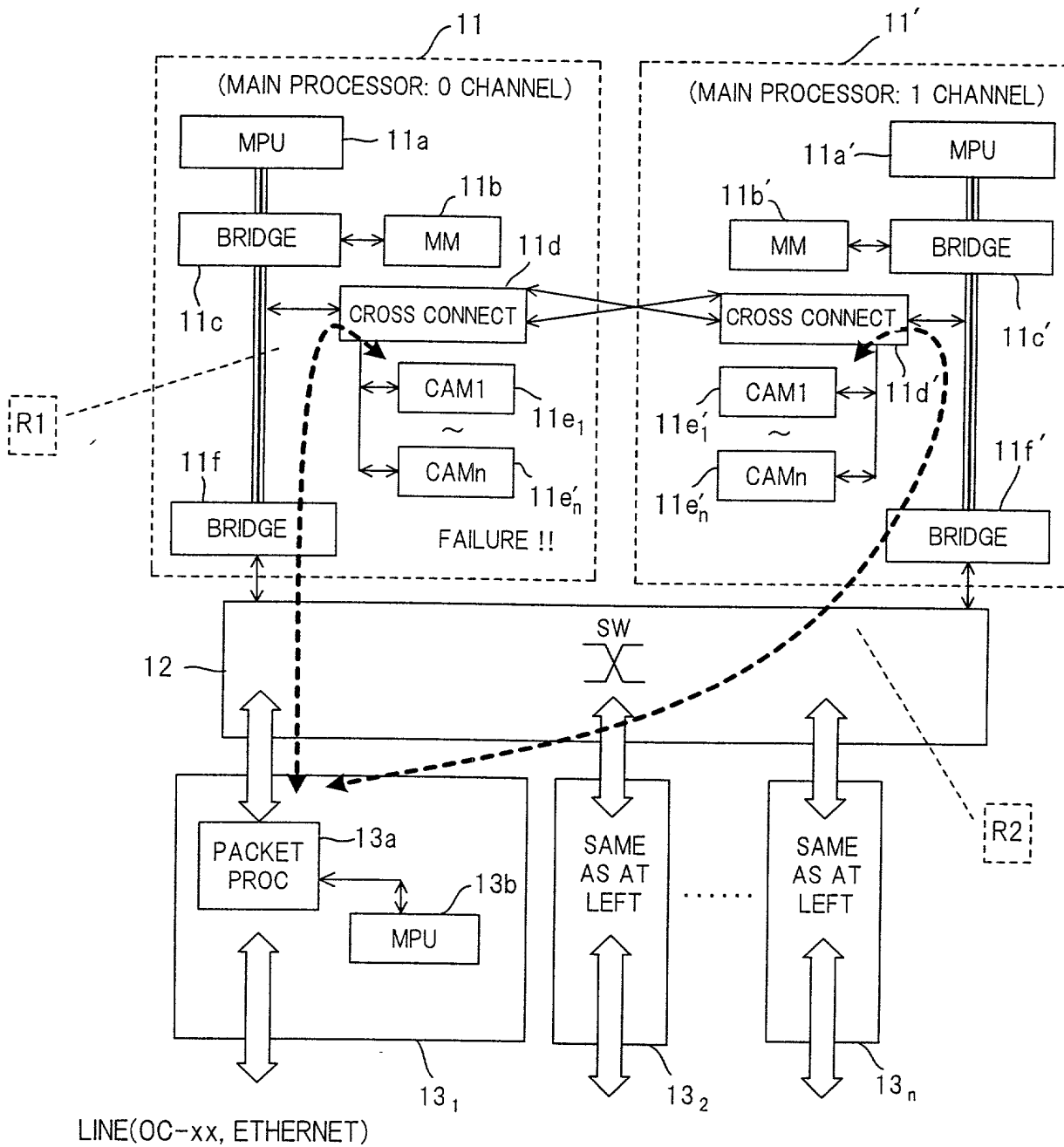
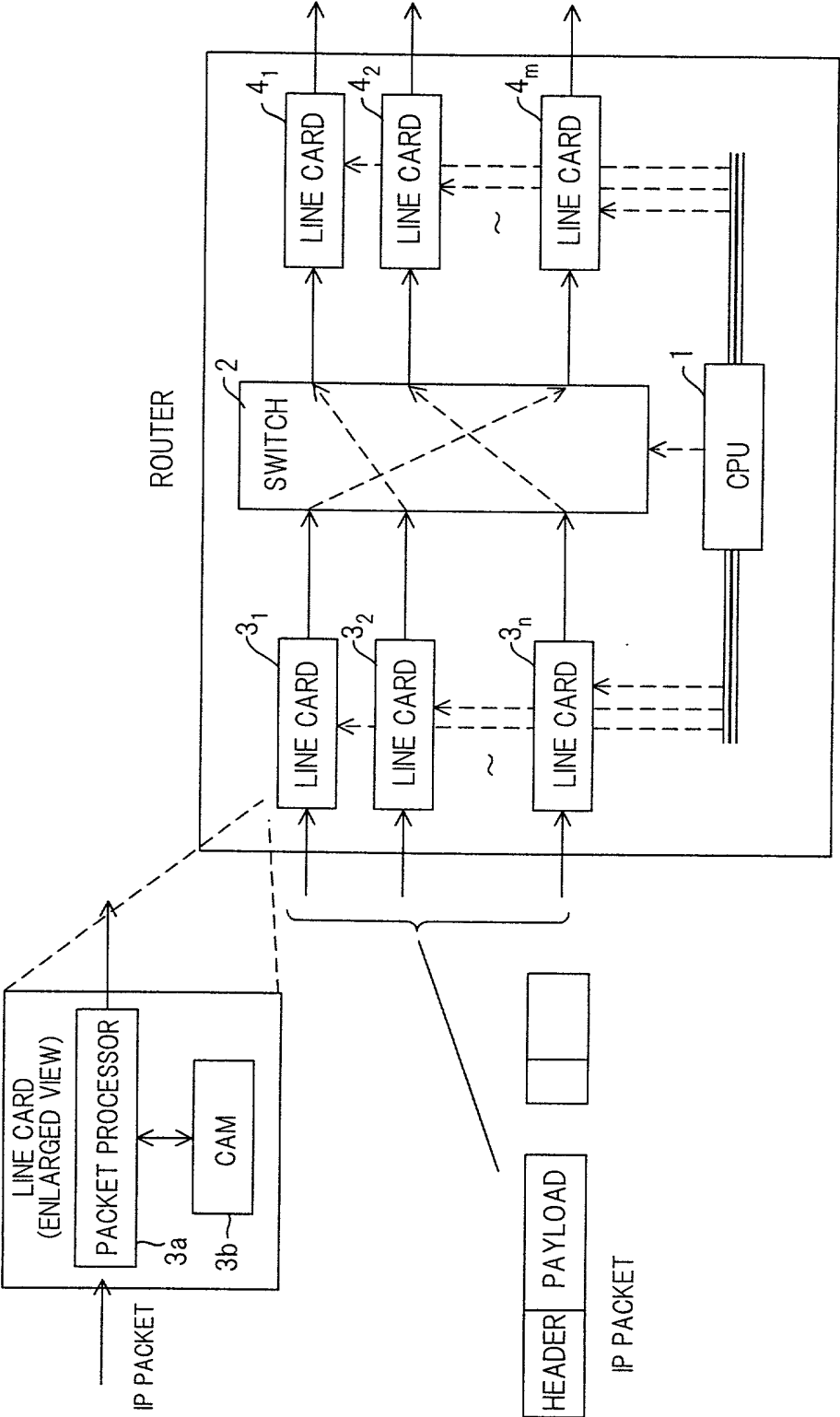


FIG. 15 PRIOR ART





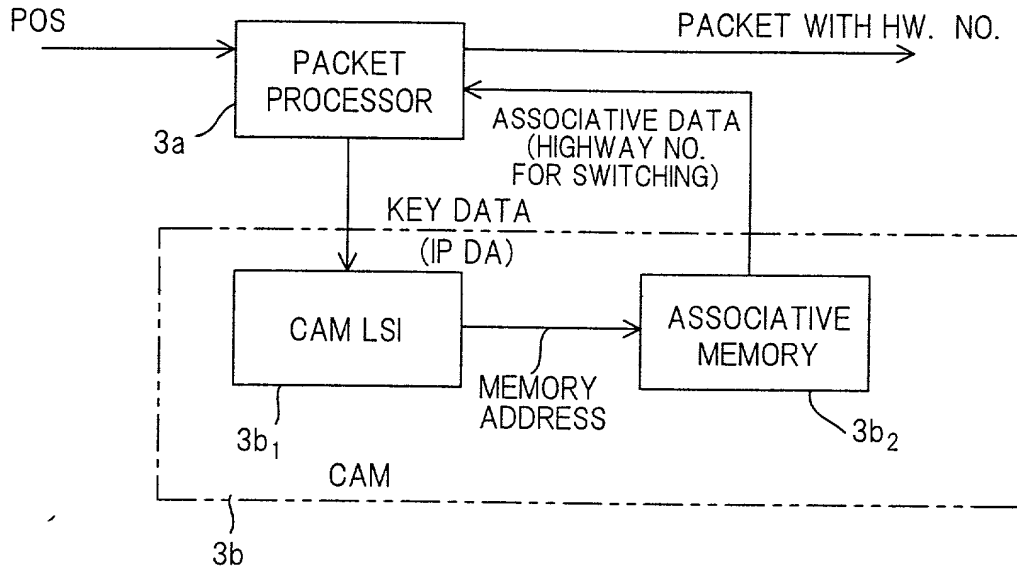
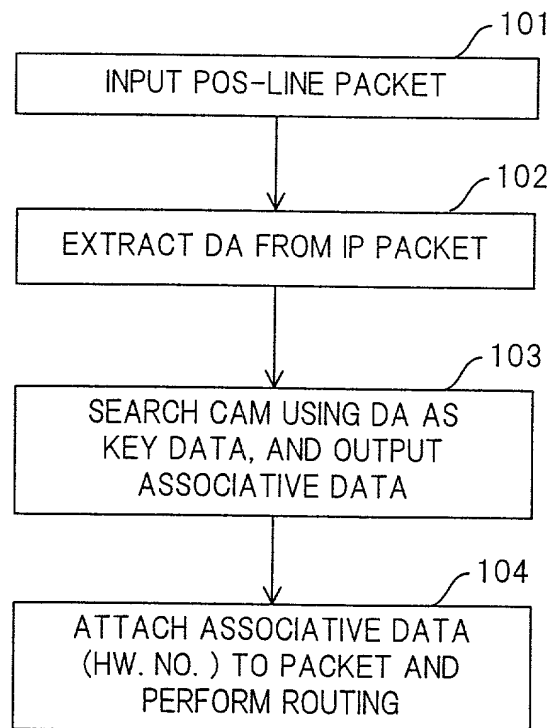
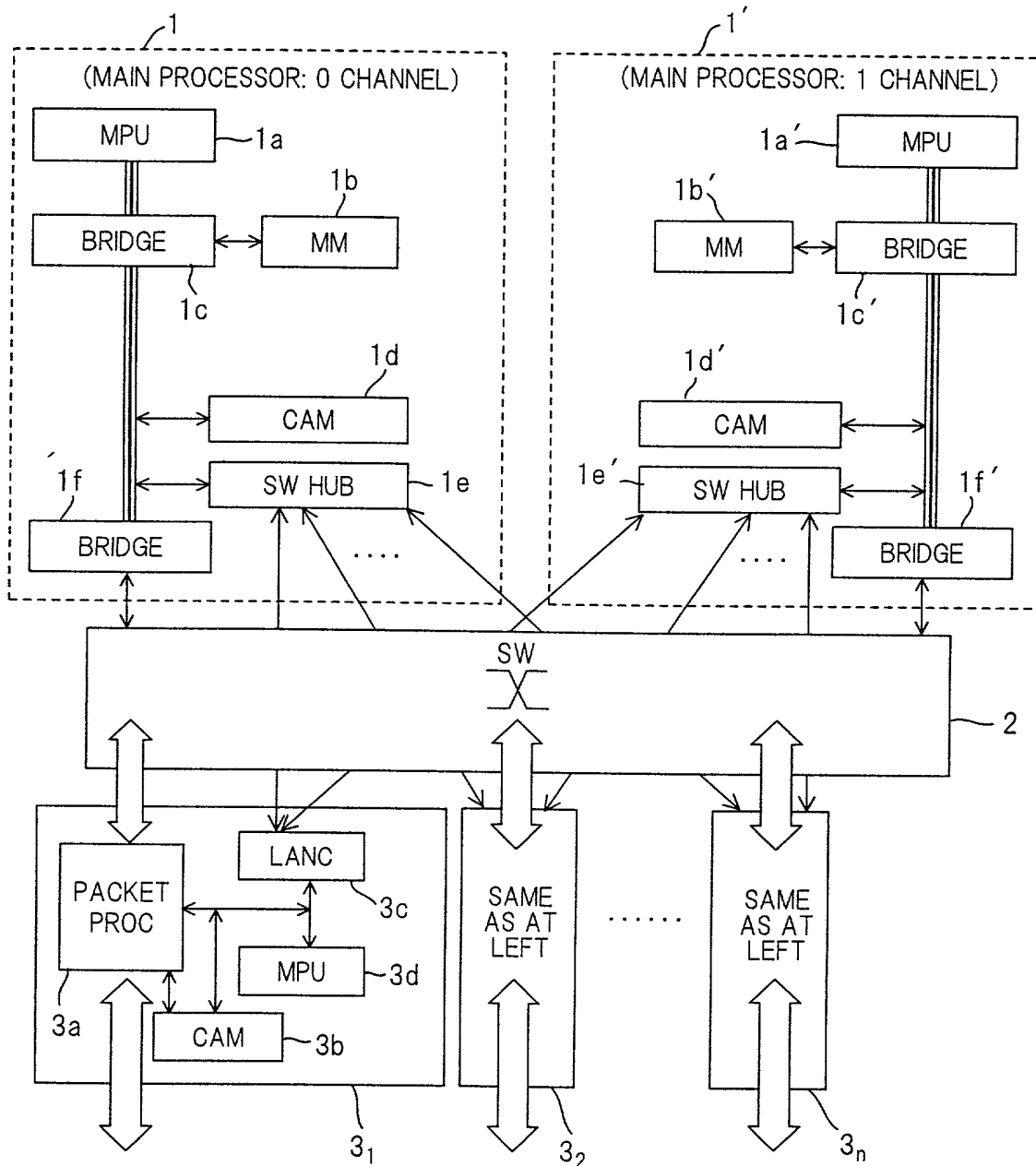
*FIG. 16 PRIOR ART**FIG. 17 PRIOR ART*

FIG. 18 PRIOR ART



LINE(OC-xx, ETHERNET)

FIG. 19 PRIOR ART

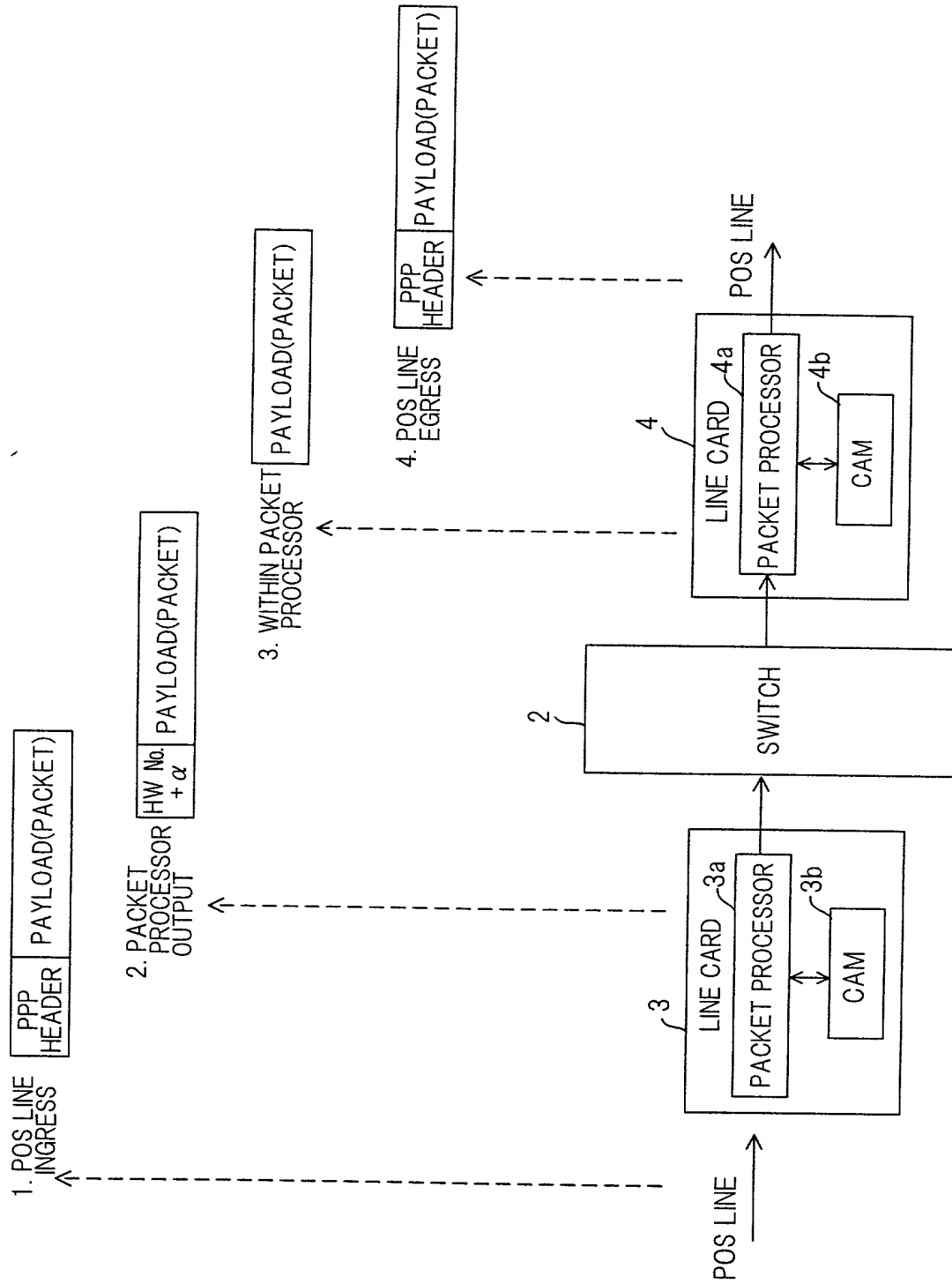
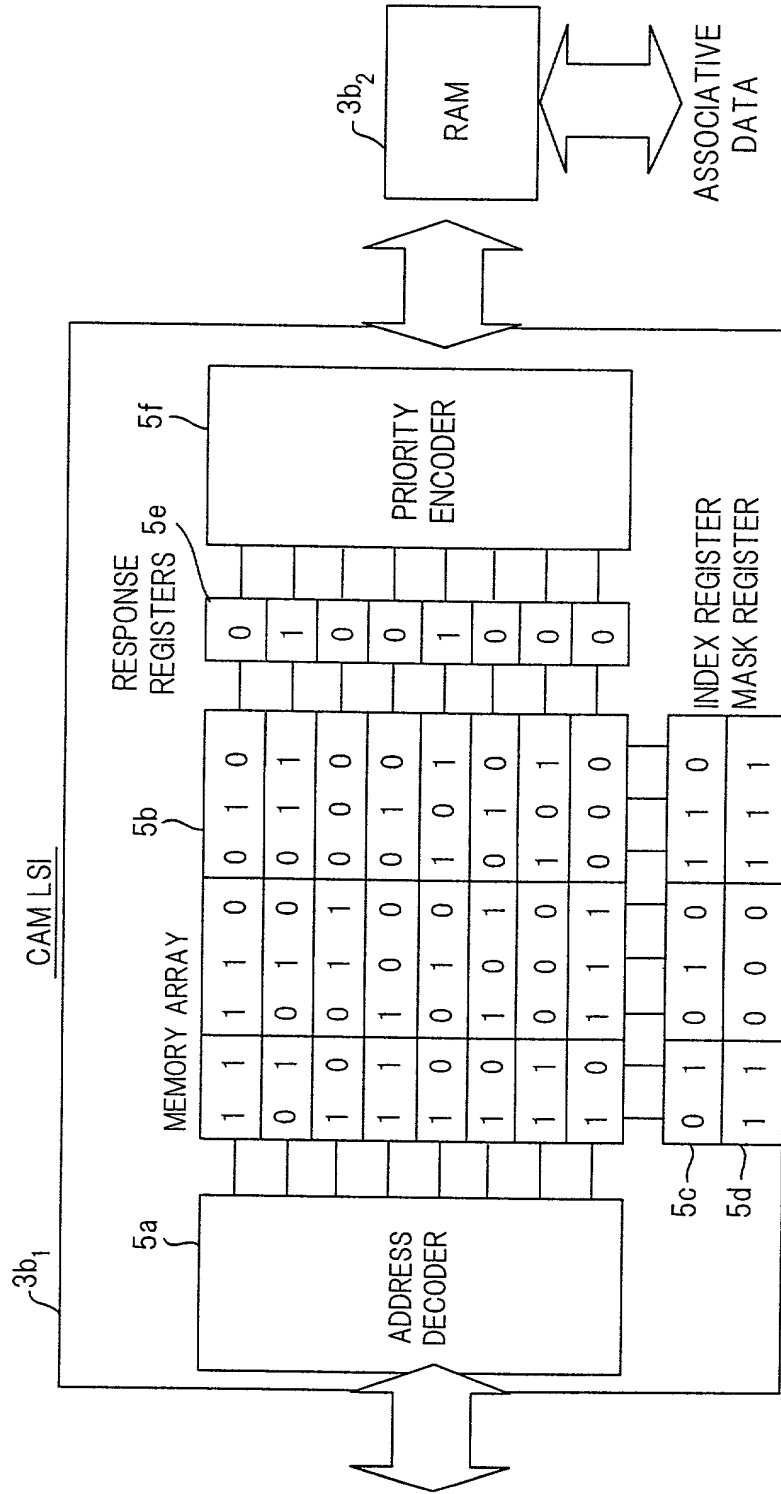


FIG. 20 PRIOR ART



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**Oath/Declaration, Small Entity,  
and Power of Attorney**

8

## Declaration and Power of Attorney For Patent Application

## 特許出願宣言書及び委任状

## Japanese Language Declaration

## 日本語宣言書

下記の氏名の発明者として、私は以下の通り宣言します。

As a below named inventor, I hereby declare that:

私の住所、私書箱、国籍は下記の私の氏名の後に記載された通りです。

My residence, post office address and citizenship are as stated next to my name.

下記の名称の発明に関して請求範囲に記載され、特許出願している発明内容について、私が最初かつ唯一の発明者（下記の氏名が一つの場合）もしくは最初かつ共同発明者であると（下記の名称が複数の場合）信じています。

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

ROUTING APPARATUS

上記発明の明細書（下記の欄でX印がついていない場合は、本表に添付）は、

the specification of which is attached hereto unless the following box is checked:

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☐ was filed on \_\_\_\_\_  
as United States Application Number or  
PCT International Application Number  
\_\_\_\_\_ and was amended on  
\_\_\_\_\_ (if applicable).

私は、特許請求範囲を含む上記訂正後の明細書を検討し、内容を理解していることをここに表明します。

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

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I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

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私は、米国法典第35編119条(a)-(d)項又は365条(b)項に基づき下記の、米国以外の国の少なくとも一カ国を指定している特許協力条約365(a)項に基づく国際出願、又は外国での特許出願もしくは発明者証の出願についての外国優先権をここに主張するとともに、優先権を主張している、本出願の前に出願された特許または発明者証の外国出願を以下に、枠内をマークすることで、示しています。

### Prior Foreign Application(s)

外国での先行出願

TOKUGAN 2000-295841

Japan

(Number)  
(番号)

(Country)  
(国名)

(Number)  
(番号)

(Country)  
(国名)

私は、第35編米国法典119条(e)項に基づいて下記の米特許出願規定に記載された権利をここに主張いたします。

(Application No.)  
(出願番号)

(Filing Date)  
(出願日)

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(Application No.)  
(出願番号)

(Filing Date)  
(出願日)

(Application No.)  
(出願番号)

(Filing Date)  
(出願日)

私は、私自身の知識に基づいて本宣言書中で私が行なう表明が真実であり、かつ私の入手した情報と私の信じることに基づく表明が全て真実であると信じていること、さらに故意になされた虚偽の表明及びそれと同等の行為は米国法典第18編第1001条に基づき、罰金または拘禁、もしくはその両方により処罰されること、そしてそのような故意による虚偽の表明を行なえば、出願した、又は既に許可された特許の有効性が失われることを認識し、よってここに上記のごとく宣誓を致します。

I hereby claim foreign priority under Title 35, United States Code, Section 119 (a)-(d) or 365(b) of any foreign application(s) for patent or inventor's certificate, or 365(a) of any PCT International application which designated at least one country other than the United States, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or PCT International application having a filing date before that of the application on which priority is claimed.

Priority Not Claimed  
優先権主張なし

28/09/2000

(Day/Month/Year Filed)  
(出願年月日)

(Day/Month/Year Filed)  
(出願年月日)

I hereby claim the benefit under Title 35, United States Code, Section 119(e) of any United States provisional application(s) listed below.

(Application No.)  
(出願番号)

(Filing Date)  
(出願日)

I hereby claim the benefit under Title 35, United States Code, Section 120 of any United States application(s), or 365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of Title 35, United States Code Section 112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56 which became available between the filing date of the prior application and the national or PCT International filing date of application.

(Status: Patented, Pending, Abandoned)  
(現況: 特許許可済、係属中、放棄済)

(Status: Patented, Pending, Abandoned)  
(現況: 特許許可済、係属中、放棄済)

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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## Japanese Language Declaration

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委任状: 私は下記の発明者として、本出願に関する一切の手続きを米特許商標局に対して遂行する弁理士または代理人として、下記の者を指名いたします。(弁理士、または代理人の氏名及び登録番号を明記のこと)

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith (list name and registration number)

書類送付先

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|             |  |                       |
|-------------|--|-----------------------|
| 唯一または第一発明者名 | Full name of sole or first inventor<br>Kazuyuki Sato   |                       |
| 発明者の署名      | Inventor's signature<br><i>Kazuyuki Sato</i>   | Date January 07, 2001 |
| 住所          | Residence<br>Sendai, Japan   |                       |
| 国籍          | Citizenship<br>Japanese  |                       |
| 私書箱         | Post Office Address c/o FUJITSU TOHOKU COMMUNICATION SYSTEMS LIMITED,<br>3-3-5, Ichibancho Aoba-ku, Sendai,<br>Miyagi 980-0811 Japan |                       |
| 第二共同発明者     | Full name of second joint inventor, if any<br>Takuya Terasawa  |                       |
| 第二共同発明者     | Second inventor's signature<br><i>Takuya Terasawa</i>  | Date January 07, 2001 |
| 住所          | Residence<br>Sendai, Japan   |                       |
| 国籍          | Citizenship<br>Japanese  |                       |
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(第三以降の共同発明者についても同様に記載し、署名をすること)

(Supply similar information and signature for third and subsequent joint inventors.)



**THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re the Application of: **Kazuyuki SATO, et al.**

Filed : **Concurrently herewith**

For : **ROUTING APPARATUS**

Serial No. : **Concurrently herewith**

January 23, 2001

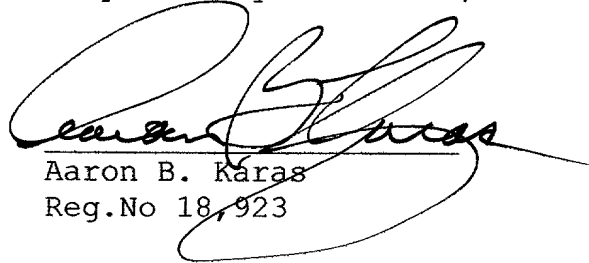
Assistant Commissioner of Patents  
Washington, D.C. 20231

**SUB-POWER OF ATTORNEY**

S I R:

I, Aaron B. Karas, Reg. No. 18,923 attorney of record herein, do hereby grant a sub-power of attorney to Linda S. Chan, Reg. No. 42,400, Harris A. Wolin, Reg. No. 39,432, Brian S. Myers, Reg. No. 46,947 and Michael Markowitz, Reg. No. 30,659 to act and sign in my behalf in the above-referenced application.

Respectfully submitted,

  
Aaron B. Karas  
Reg.No 18,923

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